Discovery comes unexpectedly for the creative mind of Selberg

By Wendy Plump
Staff Writer

If creativity is a function of luck, then genius is the highest kind of intellectual accident. Shrunk down to its simplest equation, this is Institute for Advanced Study mathematician Atle Selberg's theory on scientific creativity. Real scientific creativity is the kind that lets us see in the dark, lift wings of metal into the sky or shatter worlds by toying with particles of matter.

The wisdom that drives it, Dr. Selberg said, lies in knowing when to digress for the sake of some happy accident. "I think in some sense much has to do with luck. If you are lucky many times, then you are a genius, of course. You may be lucky just a few times or some people may not really have any great luck at all. I don't know really what the reason for this."

"I think perhaps what lies behind having luck is first of all if you have a background that is a bit different from what everybody else has so that you're not encumbered with precisely the same knowledge and are not thinking exactly the same way." It also helps if you can benefit by accidents, facts that you come across quite accidentally and start thinking about and see there is something more," Dr. Selberg said. "I would say that most of the better things I have done all came about not because I set out from the beginning to do them. Something shifted the focus of my attention completely and I ended up doing something rather different.

"One has to be able to see opportunities and learn to utilize them. Real, original work, I think, comes about in this way." Now 73, Dr. Selberg has been an assistant professor at Syracuse University. He was a member of the institute faculty as some of the greatest men of science took up residence there—Albert Einstein, J. Robert Oppenheimer, Kurt Godel and Freeman Dyson. To his own everlasting credit, Dr. Selberg was awarded the Fields medal—the mathematics equivalent of the Nobel Prize—in 1950 for his work on the theory of prime numbers.
prime numbers. His work was

recognized as having "the utmost

porance and originality" by the

athematical congress that

awarded him the medal.

Growing up in Norway, Dr.
Selberg had access to a substantial

array of mathematical works kept

by his father and rummaged

through by most of his elder

siblings. Ole Michael Ludvigsen

Selberg had a doctor's degree in

theoretical mathematics. Nevertheless, his in-

fluence on the young Atle was not

strong as might be supposed.

"What has always mattered most

me," said Dr. Selberg, "has not

an personal influence much, but

her what I got from reading

oks or articles."  

Dr. Selberg opened his first year

the University of Oslo by

ending in a paper on theoretical

theematics. The intellectual

mate in Norway at that time was

seriously richer for mainstream

ences like chemistry or botany

it was for mathematics.

Consequently, young mathemati-

cs evolved largely on their own; It

the Galapagos factor, be-

cause it yielded some mathematical

attributions that might not have

me about had they not been so

lated.

"There was no formation of any

class of school (of thought) and

ple largely did not develop on

fluence of one specific

cher," Dr. Selberg explained.

essentially all of them were

ntaught.

As a consequence we had in

sequence a more varied selection

mathematicians than some of the

er small countries where what

ould call schools under the

leadership of one teacher might

tend to develop. And there might in

some sense also have been some

more originality in Norwegian

athematics for the same reason.

"That is something that has

changed with the bigger breadth of

academic life," Dr. Selberg added.

"And there was probably some-

thing gained and something lost

because of that."  

When Germany invaded Norway

the spring of 1940, Dr. Selberg

was in Oslo, studying. He left on

the first day of the invasion to join

his unit in the Norwegian Field

Artillery. He did not serve as an

officer; he had not yet been full-

y trained for such a post.

"I would have eventually ended

up as an officer because I had been

taken out for training. But that

would have required several years

of training in peace time. So you

might say my military service was

interrupted by the war," Dr.

Selberg said, smiling.

Twice during World War II, he

lacked in German war camps set

up in Norway. His incarceration in

both instances was short.

Most of the war years were spent

either at the university, before it

was closed down by the Germans,

or studying in his hometown. A

steady stream of academicians fle-

eing Germany came through the

Scandinavian countries. Among

them was Carl Ludwig Siegel, who

delivered some lectures in Oslo.

It was this scholar who wrote to

Dr. Selberg in the spring of 1947

from the Institute of Advanced

Study, asking him to come to

Princeton. Having received his
docorate from the University of

Osl0 and with few concrete plans for

the future, the young mathematician

accepted the invitation.

Dr. Selberg arrived at the in-

stitute in the fall of 1947, a few

months before his bride, Hed. She

stayed behind in Sweden after the

invasion to conclude some business

before moving to the states.

These early years at the institute

were among his best, Dr. Selberg

said. He had a good social life and

a growing young family. Moreover,

they were his most successful years

mathematically.

This was not an accident so much

as the proper course for a young

scientist mind.

"In the '40s when I was young, I

was more active. Of course this is

the nature of mathematics and

theoretical physics. You do slow

down with the years. You gain

experience, you can still do things.

But you do usually your best work

at a younger age.

"Maybe (it is) that as you get

older your mind is more en-

riched by knowing too many

things. I don't know. It is differ-

ent in the scholarly world. Historians

course tend to reach their best years

only rather late. But in mathematics

or theoretical physics, the best work

is often done at a rather young

age. It's a fact of life,"

J. Robert Oppenheimer arrived at

the institute shortly after Dr.

Selberg. His presence at the helm

would force the institute into the

public arena in a manner not seen

before, and has not seen since.

Admiral Lewis Strauss, then

chairman of the Atomic Energy

Commission, wanted Oppenheimer

stripped of his security clearance

because of suspected Communist

sympathies.

As the scrutiny into Op-

penheimer's background intensified

from the early '50s on, scientific

work at the institute was often

interrupted by the momentum of

controversy.

There were governmental in-

vestigations at the institute. FBI

agents, wiretaps. There was even a

crepted bugging device planted at

Olden Manor, the director's home.

And of course there were reporters
dogging every development.

The institute became the setting

for the dismantling of Op-

penheimer's international in-

fluence. According to Dr. Selberg,

the faculty was as divided in its

loyalties as it was absorbed in the

unfolding events.

"I felt that this type of bringing

up all kinds of irrelevancy, to my

mind, things, these radical affili-

ations, were rather unjustified. So I

felt these attacks on him were not

appropriate," said Dr. Selberg.

"I must say that on the other

hand, there were many qualities in

Admiral Strauss that I appreciated

also. He probably thought that he

was doing something that was

necessary in the sense that he was

afraid of Oppenheimer's influence

and powers of persuasion."

Some faculty members agreed

with Admiral Strauss that limiting

Oppenheimer's influence in the de-

velopment of the hydrogen bomb

was a good idea. Others simply felt

the investigation was mishandled.

Still others, like Kurt Godel, fol-

lowed the lead of Albert Einstein or

another faculty luminaries.

Despite the internal disagree-

ments, most faculty members end-

ed up signing a statement in general

support of Oppenheimer that was

sent in June of 1954 to the New

York Times.

The years at the institute since

Oppenheimer have been unusually

quiet. Dr. Selberg says while there

is always the opportunity to get

more work done under this kind of

atmosphere, he added he is unsure

of its ultimate value.

"I don't know whether this

means the institute is becoming too

complacent with itself," Dr.

Selberg said. "I've often thought

that it may not be so good for a

place if people are too happy with

themselves and their colleagues.

This may indicate that their

standards are slipping, per-

haps..."

For his own part, Dr. Selberg

spends his days working out the
details of mathematical concepts

developed long ago. He writes

papers, spends time with his wife,

and works with a few students.

At home, he has an immense

seashell collection — "More than I

can keep out" — and maintains his

interest in botany. As an adoles-

cent, Dr. Selberg said, he collect-

ed more than 500 different species of

Norwegian plants to fulfill a school

requirement.

The interest in minutiae has lent

great deal to his own ability to

coverse.

"(Such interests) taught me to

keep my eyes about me when I am

outside. I can notice things by the

side, anything that is different

from the ordinary."  

This principle, in turn, can be

applied to almost any creative

eavor. "One has to be receptive

and alert to notice when something

different is happening," Dr. Selberg

said. "One has to have a certain open-

ness. You can't have a closed mind

because then you will not notice

anything but what you have decided

to notice. I think that shouldn't be

set in one's opinions.

"I shouldn't be too convinced

about what so-called experts say

either," he added. "I should be

very skeptical, particularly if they

are making statements about prob-

lems that are still unsolved. This is

important particularly for the

younger..."

An image springs to mind of the

young Atle, working during the war

years alone in his library, without

the benefit of teacher, school or

colleague. "They shouldn't be too

taken in," Dr. Selberg concluded,

"with what the authorities say."